Customer No.: 31561
Application No.: 10/604,884
Docket No.: 9761-US-PA

REMARKS

Present Status of the Application

The Office Action rejected all presently pending claims 10-24. Specifically, claims 10-15 and 18-24 were rejected under 35 U.S.C. 102(a) as being anticipated by Batra et al. (US 2003-0235064 A1), and claims 16-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Batra et al. in view of Wolf, Vol. 1, pages 340-359. Reconsideration of claims 10-24 is respectfully requested.

Discussion of Office Action Rejections under 35 U.S.C. 102(a)

Claims 10-15 and 18-24 were rejected under 35 U.S.C. 102(a) as being anticipated by Batra et al.

As mentioned in the previous Response for this application, one feature of independent claim 10 is forming a ***metal oxide layer*** over a substrate and then performing annealing to ***convert the metal oxide layer to metal nano-particles*** with thermal dissociation.

Applicants have argued, in the previous Response, that Batra et al. fail to disclose or suggest the above feature of claim 10 because Batra et al. actually disclose "*directly depositing metal nano-particles 23 on the tunnel oxide layer*" or "*depositing a metal (platinum) and then performing an annealing to convert the metal (platinum) to metal (platinum) nano-crystals 23*", as described in **[0021]**, lines 7-17.

PAGE 3/15 * RCVD AT 3/18/2005 2:28:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:23698454 * DURATION (mm-ss):07-06

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In response thereto, Examiner asserts in point 6 (Page 4) of this Final Office Action that the step of depositing platinum which "*is reacted with oxidizing gas such as O_2*" would yield platinum oxide and the "addition" step wherein "the substrate may be annealed at a temperature of from about 20°C to about 800°C would "convert the platinum to small nano-crystalline beads" which clearly anticipate the claim.

However, Applicants respectfully submit that according to **[0021]**, lines 9-10 of Batra et al., it is actually the ***(trimethyl)-methylcyclopentadienyl platinum (IV)*** ($MeCpPtMe_3$), rather than platinum, that "*is reacted with oxidizing gas such as O_2*". Meanwhile, according to the article entitled "*Preparation of Pt thin films deposited by metalorganic chemical vapor deposition for ferroelectric thin films*" in *Thin Solid Films* **303** (1997) 136-142 (please see the **Appendix**), the MOCVD process using $MeCpPtMe_3$ and O_2 as reaction gases actually produces ***elementary platinum*** but ***not platinum oxide,*** as indicated by the Auger electron spectra in Figs. 2(a) and 2(b) that show ***Pt only*** and by the descriptions in pages 137-138. According to the article, either H_2 or O_2 can be used to react with $MeCpPtMe_3$ to deposit elementary platinum, but using O_2 ***instead of*** H_2 can effectively prevent carbon contamination in the elementary Pt film.

Since the above-mentioned article clearly shows that the MOCVD process using $MeCpPtMe_3$ and O_2 as reaction gases produces ***elementary platinum*** and Batra et al. also disclose in **[0021]**, lines 9-11 that $MeCpPtMe_3$ is reacted with oxidizing gases like O_2 and N_2O to deposit ***platinum*** rather than platinum oxide, the above feature of independent claim 10 (forming ***metal oxide*** and converting it to metal nano-particles) is not disclosed or suggested in Batra et al.

PAGE 4/15 * RCVD AT 3/18/2005 2:28:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:23698454 * DURATION (mm-ss):07-06

For at least the reasons mentioned above, Applicants respectfully submit that independent claim 10 patently defines over the prior art.

As for claim 11, Examiner asserts in point 7 (Page 4) of this Final Office Action that the goal of Batra et al. is forming an *advanced* dielectric material by the steps in **[0021]** using metal such as platinum and oxidizing gas such as O_2 to form a metal oxide as a dielectric material and then annealing the dielectric material to have an *advanced* dielectric layer with metal nano-particles.

However, as described in paragraph **[0008]** and claim 40 [*the insulating layer formed over the Pt nano-crystal layer (independent claim 32) comprises at least one advanced dielectric layer*] of Batra et al., the advanced dielectric layer of Batra et al. is actually a layer of high-k material like Ta_2O_5, $BaSrTiO_3$, HfO_2 or ZrO_2 formed ***under*** or ***over*** the dielectric layer with metal nano-particles, ***but is not the dielectric layer with metal nano-particles***, which ***cannot*** be an advanced high-k layer because the metal is a good electrical conductor that will screen the electric field due to the free electrons therein. Since the metal oxide (Ta_2O_5, $BaSrTiO_3$, HfO_2 or ZrO_2) layer serving as the advanced dielectric layer in Batra et al. will not be converted to metal nano-particles in annealing, it is impossible in Batra et al. to form, from the advanced dielectric layer, another dielectric layer with metal nano-particles therein acting as another charge-trapping layer.

On the other hand, since the metal oxide layer in independent claim 10 is converted to a layer of metal nano-particles by annealing, the metal oxide layers formed in dependent claim 11

PAGE 5/15 * RCVD AT 3/18/2005 2:28:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:23698454 * DURATION (mm-ss):07-06

are converted to layers of metal nano-particles by annealing. Accordingly, the above feature of claim 11 is not disclosed or suggested in Batra et al.

For at least the reasons mentioned above and the same reasons applied to claim 10, Applicants respectfully submit that claim 11 dependent from claim 10 also patently defines over the prior art.

As for claims 12-15 and 23, the Office Action asserts in Pages 2 and 3 that Batra et al. disclose the possible materials, forming methods and processing methods of the ***metal oxide layer***. However, no ***metal oxide layer capable of producing metal nano-particles*** is formed in Batra et al., as mentioned above.

For at least the reasons mentioned above and the same reasons applied to claim 10, Applicants respectfully submit that claims 12-15 and 23 dependent from claim 10 also patently define over the prior art.

As for claims 18-19, 20-22 and 24, Applicants respectfully submit that claims 18-19, 20-22 and 24 dependent from claim 10 also patently define over the prior art, for at least the same reasons applied to independent claim 10.

Discussion of Office Action Rejections under 35 U.S.C. 103(a)

Claims 16-17 that are indirectly dependent from claim 10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Batra et al. in view of Wolf.

As mentioned above, Batra et al. fail to teach or suggest the above feature of claim 10.

PAGE 6/15 * RCVD AT 3/18/2005 2:28:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:23698454 * DURATION (mm-ss):07-06

"forming a metal oxide layer and then performing an annealing to convert the metal oxide layer to metal nano-particles". Wolf either does not teach or suggest the feature. Therefore, at least the feature of claims 16-17 that is inherited from independent claim 10 cannot be obtained by combining Batra et al. and Wolf.

For at least the reason mentioned above and the same reasons applied to claim 10, Applicants respectfully submit that claims 16-17 also patently define over the prior art.

PAGE 7/15 * RCVD AT 3/18/2005 2:28:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:23698454 * DURATION (mm-ss):07-06

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CONCLUSION

For at least the forgoing reasons, it is believed that all pending claims 10-24 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

Date: March 18, 2005

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PAGE 8/15 * RCVD AT 3/18/2005 2:28:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:23698454 * DURATION (mm-ss):07-06

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